

REMARKS

Claims 1-14 are pending in the present application. Claims 3 and 4 are being amended herein.

Claim 4 is rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. The Examiner believes that there is insufficient antecedent basis in claim 4 for the term “the further mass spectra.” The rejection is traversed and reconsideration is respectfully requested, particularly in view of the clarifying amendments to the claims.

The chain of dependency of claim 4 is being amended to ultimately include claim 2 which introduces the term “further mass spectra”. Thus, it is respectfully submitted that the rejection of claim 4 for lack of antecedent basis is now overcome.

Claims 1-14 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Voorhees et al. (U.S. Pat. No. 5,862,512). The rejection is traversed and reconsideration is respectfully requested.

Claim 1 of the present application defines a method of analyzing a complex hydrocarbon-containing mixture, the method comprising the steps of: obtaining a liquid sample of the complex hydrocarbon-containing mixture; injecting the sample into a liquid carrier flowing to a mass spectrometer, wherein the mass spectrometer is set so as to ionize molecules in the sample without causing fragmentation thereof; recording a first mass spectrum for ions obtained from the sample; and using the mass spectrum to obtain a fingerprint of the mixture.

Thus, the present invention as claimed concerns the analysis of liquid samples, and as part of the method a liquid sample of the mixture to be analyzed is injected into a liquid carrier.

In clear contrast to this, Voorhees et al. relates to the analysis of soil gas

samples, and only discloses methods involving the sampling and analysis of gases. Also, the soil gas samples are separated by gas chromatography before mass spectral analysis, which is in contrast to the method of claim 1 of the present application, where the sample, injected into the liquid carrier, is conveyed as a whole to the mass spectrometer. Voorhees et al. therefore does not disclose all of the elements of claim 1, because there is no disclosure of a step of “obtaining a liquid sample of the complex hydrocarbon-containing mixture”, and there is also no disclosure of a step of “injecting the sample into a liquid carrier flowing to a mass spectrometer.”

Moreover, it is unlikely that the device of Voorhees et al. could possibly include a mass spectrometer set so as to ionize molecules in a liquid sample of a complex hydrocarbon-containing mixture “without causing fragmentation thereof”. Voorhees et al. does not consider the processing of the longer (heavier) hydrocarbons that would be found in a liquid sample compared to a soil gas sample, which would typically contain much lighter more volatile compounds. Hence, Voorhees et al. contains no disclosure of a mass spectrometer set to avoid fragmentation in liquid samples. Claim 1 is therefore is not anticipated by Voorhees et al.

Moreover, Voorhees et al. does not combine two or more mass spectra from the same sample, and hence Voorhees does not anticipate claim 2. Voorhees et al., relating only to analysis of gases, also does not disclose the injection of the sample into a continuous flow of eluent fluid to form a plug of the sample within the flow of eluent fluid, as recited in claim 3. Similarly, Voorhees et al. fails to disclose the use of the full width half maximum of the concentration of the (liquid) sample in the eluent fluid, as recited in claim 4. Regarding claim 5, Voorhees et al. does not disclose ionization of a single sample by two or more different ionization techniques, but instead performs the same ionization

technique on different samples. The ionization techniques as recited in claim 6 are not explicitly disclosed in Voorhees. Claims 7 through 10 are not anticipated at least through their ultimate dependence from claim 1. Claims 11 through 14 are not anticipated by Voorhees et al. for at least the same reasons as set forth for claim 1 and its dependent claims as discussed above. Thus, contrary to the Examiner's assertion, Voorhees et al. does not clearly anticipate claims 1-14 of the present application.

In view of the foregoing, it is respectfully submitted that claims 1-14 are in condition for allowance. All issues raised by the Examiner having been addressed, an early action to that effect is earnestly solicited.

No fees or deficiencies in fees are believed to be owed. However, authorization is hereby given to charge our Deposit Account No. 13-0235 in the event any such fees are owed.

Respectfully submitted,

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